

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A multilayer printed wiring board manufacturing apparatus, to be used for processing a multilayer printed wiring board having an interlayer resin insulator, comprising:

a processing laser source, a scanning head for deflecting a laser beam in X-Y directions, a camera for reading positioning marks ~~covering~~ covered with the interlayer resin insulator of the multilayer printed wiring board, an X-Y table for placing the multilayer printed wiring board, an input section for inputting processing data of the multilayer printed wiring board, a memory section for storing the processing data or an arithmetic operations result and an arithmetic operating section, wherein

the processing data is input from the input section and this processing data is stored in the memory section;

a position of a positioning mark of the multilayer printed wiring board placed on the X-Y table is measured with the camera;

the input processing data is corrected on the basis of the measured position of the positioning mark to generate X-Y table drive data in the arithmetic section and this drive data is then stored in the memory section; and

the drive data is read from the memory section and then the X-Y table and the scanning head are controlled in a control section and thereby the laser beam is radiated to the multilayer printed wiring board to eliminate the interlayer resin layer to form a hole for a via hole.

2. (Original) The multilayer printed wiring board manufacturing apparatus according to claim 1, wherein said positioning mark is formed of a metal conductor.

3. (Original) The multilayer printed wiring board manufacturing apparatus according to claim 1, wherein said positioning mark is formed simultaneously with a conductive circuit.

4. (Currently Amended) A multilayer printed wiring board manufacturing method comprising the steps of:

forming a positioning mark covered with an interlayer insulating agent layer and an interlayer insulating agent layer on a multilayer printed wiring board;

placing a multilayer printed wiring board having formed said positioning mark on an X-Y table of a multilayer printed wiring board manufacturing apparatus ~~consisting of~~ comprising a processing laser source, a scanning head for deflecting a direction of a laser beam in X-Y directions, a camera for reading the positioning mark of the multilayer printed wiring board, an X-Y table for placing the multilayer printed wiring board, an input section for inputting processing data of the multilayer printed wiring board, a memory section for storing the processing data or an arithmetic operations result and an arithmetic operating section, and inputting ~~process-log~~ processing data to this manufacturing apparatus:

measuring a position of the positioning mark of the multilayer printed wiring board with the camera, correcting the input processing data based on the measured positioning mark position to generate scanning head and X-Y table drive data in the arithmetic operating section and then storing this drive data in the memory section; and

reading the drive data from the memory section to control the X-Y table and the scanning head in a control section and radiating the laser beam to the multilayer printed wiring board to eliminate the interlayer resin layer to form a hole for a via hole.

5. (Previously Presented) A multilayer printed wiring board manufacturing apparatus comprising a CO₂ laser source, a scanning head for deflecting a direction of a laser beam in X-Y directions or an X-Y table for displacing a position of a multilayer printed wiring board, wherein the laser beam oscillated from said CO₂ laser source is converted to a beam of shortened wavelength by harmonic wave generating means, a diffraction of the laser beam is controlled, and the laser beam forms a via hole.

6. (Canceled)

7. (Original) A multilayer printed wiring board manufacturing apparatus, comprising:

a CO₂ laser source, a scanning head for deflecting the laser beam in the X-Y directions, a camera for reading the positioning marks of a multilayer printed wiring board, an X-Y table for placing a multilayer printed wiring board, an input section for inputting the processing data of the multilayer printed wiring board, a memory section for storing the processing data or the arithmetic operations result, and an arithmetic operating section, wherein

the processing data is input from the input section and this processing data is stored in the memory section;

position of the target mark of the multilayer printed wiring board placed on the X-Y table is measured with the camera;

the data for driving the scanning head and the X-Y table is generated from the measured position and the input processing data in the arithmetic operating section, and the drive data is stored in the memory section; and

the drive data is read from the memory section and then the X-Y table and the scanning head are controlled in the control section and thereby the laser beam is radiated to the multilayer printed wiring board to eliminate the interlayer resin layer to form the hole,

the laser beam oscillated from said CO₂ laser source being converted to the shortened wavelength laser beam of second harmonic wave by harmonic wave generating means.

8. (Previously Presented) The multilayer printed wiring board manufacturing apparatus according to any claim of claims 5 to 7, wherein said harmonic wave generating means is a non-linear optical crystal which reflects the processing laser to the harmonic wave emitting side and gives thereto the function to transmitting harmonic wave.

9. (Original) The multilayer printed wiring board manufacturing apparatus according to claim 8, wherein said non-linear optical crystal is formed of a material selected from tellurium, gallium-selenium, antimony sulfide, arsenic sulfide, mercury sulfide and selenium.

10. (Original) A multilayer printed wiring board manufacturing method utilizing a manufacturing apparatus comprising a CO₂ laser source, a harmonic wave generating apparatus for converting the laser beam from said CO₂ laser source to the shortened wavelength beam of the second harmonic wave, a scanning head for deflecting the direction of the laser beam in the X-Y directions, a camera for reading the target mark of the multilayer printed wiring board and an X-Y table for placing the multilayer printed wiring board, comprising the steps of:

measuring, with a camera, the target mark position of the multilayer printed wiring board having the interlayer resin insulator placed on the X-Y table;

generating the scanning head and the X-Y table drive data from the measured position and the processing data; and

controlling the X-Y table and the scanning head based on the drive data and radiating the shortened wavelength beam of the second harmonic wave obtained from the harmonic wave generating apparatus to the multilayer printed wiring board to eliminate the interlayer resin layer to form a hole.

11. (Previously Presented) A laser processing apparatus comprising a CO₂ laser source, a scanning head for deflecting a direction of a laser beam to X-Y directions or an X-Y table for displacing a position of a work piece to be processed, wherein the laser beam oscillated from said CO₂ laser source is converted to a shortened wavelength beam by harmonic wave generating means, a diffraction of the laser beam is controlled, and the laser beam forms a via hole.

12-25. (Canceled)

26. (Previously Presented) The multilayer printed wiring board manufacturing apparatus according to Claim 5, wherein said via hole is formed by focussed spot diameter.

27. (Previously Presented) The multilayer printed wiring board manufacturing apparatus according to Claim 11, wherein said via hole is formed by focussed spot diameter.